

Development of Canva-Based Digital Teaching Materials to Train Students' Understanding of Dynamic Fluid Concepts

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Abstract

The research aims to analyze students' needs for Canva-based digital teaching materials on dynamic fluid material. Research is a type of research and development. The design of the development model uses the ADDIE steps (Analysis, Design, Develop, Implementation, Evaluation). However, this article will only discuss the results at the analysis stage. What was done at the analysis stage was distributing questionnaires to find out students' needs for Canva-based digital teaching materials. The sample in this study were students of class XI IPA at SMAN 4, SMAN 5, and SMAN 7 Bengkulu City. Data collection techniques used include non-test techniques. Data analysis techniques using qualitative and quantitative data analysis techniques. The results of the study show that students need electronic teaching materials (E-Modules) that can train their ability to understand concepts in dynamic fluid materials.

Keywords: Digital Teaching Materials, Canva, Understanding Concepts, Fluid Dynamics

A. Introduction

The current Indonesian curriculum is the revised 2013 curriculum [1]. One focus of learning objectives in the 2013 curriculum is to develop students' ability to understand concepts, explain the interrelationships between concepts, and use concepts efficiently and appropriately in problem solving [2].

Mastery of the concept is one of the objectives of learning physics and is an indicator of the success of learning physics. Concept mastery is defined as the student's ability to apply newly learned knowledge to the phenomena of everyday life [3].

Dynamic fluid is material in high school physics subjects found in KD 3.7 and KD 4.7 in the 2013 curriculum. The basic competence (KD) that is expected and must be achieved by students in dynamic fluid learning based on the 2013 curriculum is that students can apply dynamic fluid principles in technology and able to modify ideas or simple project ideas related to KD 3.7 [4], [5].

Digital technology is the thing that most influences education in the world today. Information and communication technology is used in learning activities with the aim of increasing effectiveness in the process of learning activities. Information technology applied in the form of digital teaching materials can make subject matter more interesting which includes material not only in written form but also in video form and so on [6].

Digital teaching materials are an important component in achieving learning objectives [7]. Content accessibility in digital teaching materials can support the learning process effectively and efficiently. In terms of cognition, digital teaching materials can make it easier for students to understand material concepts and increase reasoning power. Then, digital teaching materials assist students in deepening the material with student learning activities in the form of thinking and understanding, as well as providing real (concrete) experiences in order to create sustainable learning [8], [9].

Students who are digital natives are very familiar with using digital devices and spend more time with the technology or digital devices they have. With this character, students who are digital natives will find it easier to learn using technology. They will be interested in teaching materials that can be accessed using digital devices such as smartphones [10]–[12].

The development of digital teaching materials has also been carried out by several previous researchers, including Dewi et al (2021) who produced teaching materials that integrate the STEM approach and eco-spatial behavior which are very suitable for use in geography learning [13]. Then, the research conducted by Savitri et al (2022), with the results of the research showing that the PBL digital teaching materials he

developed could improve students' understanding of concepts based on the results of the N-Gain test with an average score of 0.7 in the high category, and the response students get an average score of 4.4 in the very good category [14]. Furthermore, research conducted by Farhana et al (2022), with the results of research showing that the digital-based teaching materials they developed have helped increase mastery of competency achievement targets in English subject class XII at Atlantis Vocational High School, especially the Multimedia and Nursing majors [15].

Based on the description above, the researcher decided to develop digital teaching materials which began with an analysis of students' needs for canva-based digital teaching materials to improve conceptual understanding of fluid dynamics material.

B. Research Methods

This research is a type of research and development. The design of the development model in this study uses the ADDIE steps (Analysis, Design, Develop, Implementation, Evaluation). However, this article will only discuss the results at the analysis stage. What was done at the analysis stage was distributing questionnaires to find out students' needs for Canva-based digital teaching materials. The sample in this study were students of class XI IPA at SMAN 4, SMAN 5, and SMAN 7 Bengkulu City. Data collection techniques used include non-test techniques. Data analysis techniques using qualitative and quantitative data analysis techniques. The analysis was carried out on the data obtained in the form of percentages. Percentages are obtained based on modified Likert Scale calculations. With a Likert scale, then the variables to be measured are translated into variable indicators. Furthermore, these indicators are used as guidelines in compiling items in the form of questions or statements. Instrument items are given quantitative values as in table 1 below:

Table1.Calculation of the Likert Scale	
Evaluation	Scale Value
Strongly agree	4
Agree	3
Don't agree	2
Strongly Disagree	1

The questionnaire was tested for validity and reliability using SPSS with the following conditions: Valid if r_{count} is greater than r_{table} value ($r_{\text{count}} > r_{\text{table}}$), Invalid: if r_{count} is less than r_{table} value ($r_{\text{count}} < r_{\text{table}}$), Reliable if cronbach's alpha value > 0.60 , and Not Reliable if Cronbach's alpha value < 0.60 [16].

Analysis of the results of the questionnaire was carried out quantitatively using the following formula.

$$p = \frac{n}{N} \times 100\%$$

where P is the percentage of the results of the questionnaire analysis, n is the total score of the assessment, and N is the maximum possible score. For the Likert scale, the score interpretation model can be seen in table 1.

Table 2. Interpretation of the Likert Scale	
Percentage (%)	Category
0 % - 25 %	Strongly Disagree
26 % - 50 %	Don't agree
51 % - 75 %	Agree
76 % - 100 %	Strongly agree

C. Result and Discussion

In this study, the first step of the data processing is to find the r_{count} value of each item contained in the research instrument (questionnaire). This r_{count} value is used to determine whether the instrument used is valid or not. The results of the instrument validity test can be seen in the following table.

Table 3. Instrument Validity Test Results			
Item Number	r Count	r Table	Information
1	0.416	0.1996	Valid

Item Number	r Count	r Table	Information
2	0.389		Valid
3	0.539		Valid
4	0.325		Valid
5	0.526		Valid
6	0.494		Valid
7	0.55		Valid
8	0.543		Valid
9	0.642		Valid
10	0.545		Valid
11	0.66		Valid
12	0.52		Valid
13	0.57		Valid
14	0.529		Valid
15	0.594		Valid
16	0.476		Valid
17	0.587		Valid
18	0.482		Valid
19	0.408		Valid

From the data listed in the table above it can be seen that all items have an rcount value greater than the rtable value, so all items are categorized as valid. This means that all items on the instrument can be used to measure what should be measured. Furthermore, the instrument reliability test was carried out with the results in the following table.

Table 4. Instrument Reliability Test Results

Cronbach's Alpha	N of Items
.844	19

In table 4, it can be seen that the Cronbach Alpha value is 0.844. This value is greater than 0.6, meaning that the instrument is categorized as reliable. A reliable instrument is an instrument which, when used several times to measure the same object, will produce the same data.

After testing the validity and reliability of the instrument, the percentage of answers for each item is calculated, so that it can be seen whether the respondents agree or disagree with the statements put forward. The results can be seen in the following table.

Table 5. Results of Student Needs Analysis

Item Number	Total Score (n)	Maximum Score (N)	Percentage (%)	Information
1	250	388	64,43	Agree
2	266	388	68,56	Agree
3	299	388	77,1	Strongly agree
4	296	388	76,3	Strongly agree
5	291	388	75	Agree
6	289	388	74,5	Agree
7	297	388	76,5	Strongly agree
8	319	388	82,2	Strongly agree

Item Number	Total Score (n)	Maximum Score (N)	Percentage (%)	Information
9	318	388	82	Strongly agree
10	309	388	79.6	Strongly agree
11	329	388	84.8	Strongly agree
12	318	388	82	Strongly agree
13	307	388	79,1	Strongly agree
14	321	388	82.7	Strongly agree
15	329	388	84.8	Strongly agree
16	305	388	78.6	Strongly agree
17	326	388	84	Strongly agree
18	315	388	81.2	Strongly agree
19	308	388	79.4	Strongly agree

The data shown in table 5 shows that there were 4 statements that were answered in agreement by the respondents, namely statements related to agree or disagree that respondents are interested in learning physics, during the learning process the teacher always uses textbooks, the learning media used by the teacher in learning has helped and supported the learning process, and the learning media used by the teacher has been able to increase the respondent's understanding of concepts in learning. For the other 15 statements the respondents answered strongly agree, these statements included respondents more often getting information about lessons from teachers, teachers using instructional media in the learning process, respondents more easily understand subject matter with electronic learning media, respondents needed a simple explanation of what is being studied, requires media study other as an alternative teaching media that is currently available, and requires learning media that can assist respondents in independent learning. The learning media that respondents want is one that uses simple and interesting language, which can make students more active, easy to carry anywhere, can be accessed without any restrictions, can build respondent motivation, which is electronic and includes videos in it, which can be trained me to understand in sample material from fluid dynamic concepts and understand in classifying statements on dynamic fluid material. This means that respondents need electronic teaching materials (E-Modules) that can train their ability to understand concepts in dynamic fluid material.

D. Conclusion

This research is the initial stage of research and development which aims to analyze students' needs for Canva-based digital teaching materials. The results showed that students needed electronic teaching materials (E-Modules) that could train their ability to understand concepts in dynamic fluid material.

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